younger age group (32-40 years), whereas pHPN (after age 40) and coronary artery disease (after age 50) tended to occur in higher frequency later in life. All patients were treated with continuous positive airway pressure, weight reduction, angiotensin blocking agents, aspirin, statins and coronary interventions when indicated. 252 (95%) demonstrated improvement in quality of life measurement. **Conclusion**: OSA causes profound adverse effects on cardiac functions that lead to a host of echocardiographic abnormalities. We recommend that Recho be performed in all patients with OSA, and Decho be part of the workup of OSA patients after age 55 to guide effective medical management of these debilitating illnesses.

1112-148 Two-Dimensional Point-to-Point Measurements and Best Slice Algorithm Improve Accuracy of Echocardiographic Left Ventricular Mass Determination: A Magnetic Resonance Imaging Correlation in Humans

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Background: Left ventricular mass (LVM) is a powerful predictor of cardiovascular outcome and serves as a focal point in epidemiologic and therapeutic studies. Conventional M-mode and 2-d echocardiographic LVM determinations suffer from acquisition angulation error and throughput limitations, respectively. We, therefore, developed a cylindrical hemiellipsoid "best slice" model (BSM) which tailors point to point (PTP) measurements to an algorithm minimizing long axis oblique angulation and maximizing short axis and apex-base length. Methods: We compared diastolic and systolic echocardiographic and cardiac MRI LVM determinations in 48 patients (30 men, 18 women, mean age = 46) undergoing both studies within a two week period. Models tested included: 1) standard ASE M-mode (ASE), 2) angle-independent PTP modification of ASE (ASE-PTP) and 3) 2D echo planimetric mass by bullet formula (PLAN). Conclusions: 1) In all models tested, end-systolic calculations correlated better than those at end-diastole; 2) BSM had higher correlation and less error than other PTP methods, and was comparable to planimetry in both accuracy and error; 3) Traditional ASE M-mode was inferior to 2-d PTP and planimetric models. Therefore, end-systolic BSM calculations, with higher correlations than ASE and the potential for increased throughput over planimetry, should be considered in epidemiologic and therapeutic investigations targeting LVM.

LV Mass Correlations: Echocardiography v. MRI

Model	Cardiac Timing	Pearson Correlation	95% CI	SEE
ASE	End-diastole	0.71*	0.53-0.83	55g
ASE-PTP	End-diastole	0.74*	0.63-0.87	39g
ASE-PTP	End-systole	0.78*	0.65-0.88	38g
PLAN	End-diastole	0.82*	0.68-0.90	32g
PLAN	End-systole	0.87*	0.76-0.93	25g
BSM	End-diastole	0.79*	0.65-0.88	30g
BSM	End-systole	0.85*	0.74-0.91	25g
		*p < 0.0001		

1112-149 Does Use of Harmonic Imaging Increase the Yield of Echocardiographic Left Ventricular Mass Measurements on a Population Basis? The Strong Heart Study

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Background: introduction of harmonic imaging has been accepted as improving the quality of clinical echocardiograms but no data exist on a population basis concerning its ability to reduce the frequent problem of inability to obtain left ventricular (LV) measurements by echocardiography in overweight or elderly adults.
Methods: we compared the yield of linear measurements needed to measure LV mass and fractional shortening between the second exam of the population-based Strong Heart Study (SHS-2) in 1993-1995 with fundamental imaging and Strong Heart Family Study (SHFS) in 2001-2003 with harmonic imaging. Echocardiograms were read by identical procedures with verification by highly-experienced echocardiographers.
Results: SHS-2 and SHFS participants 50-79 years of age (n=3,185 and 716, respectively) were similar in age (both 61±7 years), gender (63 vs 65% women) and diabetes prevalence (49 and 48%) but the SHFS participants studied by harmonic imaging were heavier (body mass index 32.7±8.9 vs. 31.1±6.3 kg/m^2, p<0.001) and had higher prevalence of hypertension (61 vs 49%, p<0.001). The yield of needed LV measurements increased from 2,901/3,185 (91%) to 680/716 (95%, p<0.001) in the entire population and rose similarly in the age ranges 50-59 (93% to 97%), 60-69 (90% to 94%) and 70-79 (88 to 92%)(all p<0.01). LV measurement yield was also higher with harmonic imaging in obese participants (BMI>30 kg/m^2, 93% vs 90%) and in normal to overweight participants (98% vs 93%)(both p<0.05).
Conclusion: introduction of harmonic imaging has increased the yield of LV measurements needed to quantitate LV geometry and function on a population basis, including elderly and obese adults, which have posed a particular challenge to echocardiography.

1112-150 Regional Spectrum of Tissue Doppler-Derived Myocardial Acceleration During Isovolumic Relaxation and Its Relationship to Peak Filling

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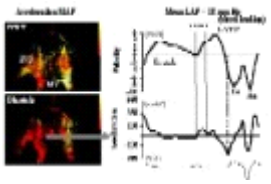
Background: This study evaluated the regional distribution of peak diastolic myocardial acceleration (pACC) and its relationship to left ventricular (LV) pressure and peak negative dP/dt (-dP/dt$_{max}$) as indices of diastolic function.
Methods: We examined 8 sheep by using 2D high frame rate digital tissue Doppler imaging (GE/VingMed Vivid FiVe) in apical 4-chamber cineloops to evaluate mitral valve annular velocity at septum and LV lateral wall. pACC derived from tissue Doppler echocardiography was analyzed during isovolumic relaxation (IVRT) and LV filling period (LVFP) from both sides of mitral valve annulus. After scanning in a baseline condition, we changed hemodynamic status by blood administration, dobutamine and metoprolol infusion. We compared the difference of pACC during IVRT and LVFP over these different conditions with -dP/dt$_{max}$ measured with a high frequency manometer tipped catheter.
Results: pACC of septal mitral valve annulus during IVRT showed a good correlation with -dP/dt$_{max}$ ($r = 0.80$, $p < 0.0001$) and varied little on blood loading. Mean LAP correlated well with pACC of septal mitral valve at annulus during LVFP ($r = 0.80$, $p < 0.0001$), but less with lateral wall.
Conclusions: Septal annulus pACC during IVRT appears to be a sensitive, preload independent marker for evaluation of LV diastolic function, and pACC during LVFP correlated well with mean LAP; combining the parameters should be especially useful.



1112-151 Digital Velocity Propagation Time Compared to Color M-Mode to Assess Flow Propagation Across the Left Ventricular Inflow: An In Vitro Study

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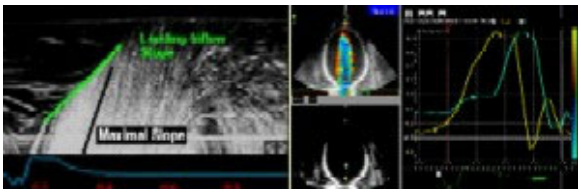
Background: The purpose of this study was to determine the accuracy of color M-Mode (CMM) in measuring the actual wavefront of flow propagation velocity (WFFPV) of mitral valve inflow and test the relationship with rate of inflow in a balloon model.
Methods: Variably compliant latex balloons were used to model the left ventricle and were connected via a wide inlet to a pump, which generated pulsatile flow. This balloon was then submerged in a water bath and a transesophageal probe was positioned near the apex. CMM images were obtained under 2D color flow guidance at 10 different stroke volumes (SV, 20 ml to 40 ml) and heart rates (HR, 40 bpm to 70 bpm) to assess WFFPV. Microbubbles were used as a contrast agent to visualize particle tracks at the wavefront of the inflow so as to directly compute reference WFFPV. Classically defined M-mode rates as well as derived velocity time upstroke propagation time were compared.
Results: Filling flow rate (SV x HR) correlated well with the WFFPV as estimated by the bubble technique (r=0.94); correlation with balloon stroke volume was poor for color (r=0.62), but much better for direct velocity upstroke propagation (r=0.86).
Conclusions: CMM can be used to assess the WFFPV, but, in this in-vitro model, it appeared to underestimate the actual WFFPV.



1112-152 Strain Rate Imaging for Identifying Tissue Torsion in Myocardial Segments: An In Vitro Model Study

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Background: The Torrent-Guasp theory hypothesizes that left ventricle is formed from a myocardial band twisted into a descending inner band and an ascending outer band that run orthogonal to each other and overlap in the septum. We attempted to identify the difference between the twisted and nontwisted segments of myocardium in a dynamic model.
Methods: We used a strip of fresh lean beef (2.5 x 2.5 x 12.5 cm) attached to a Travenol cardiac rotational pump and pulley in a water bath. The sample was twisted on one end at different cycle rates (12, 26, 40 rpm) and different degrees of rotation (45°, 90°). Tissue Doppler imaging was performed with a GE/VingMed Vivid 5 with a 2.5 MHz trans-